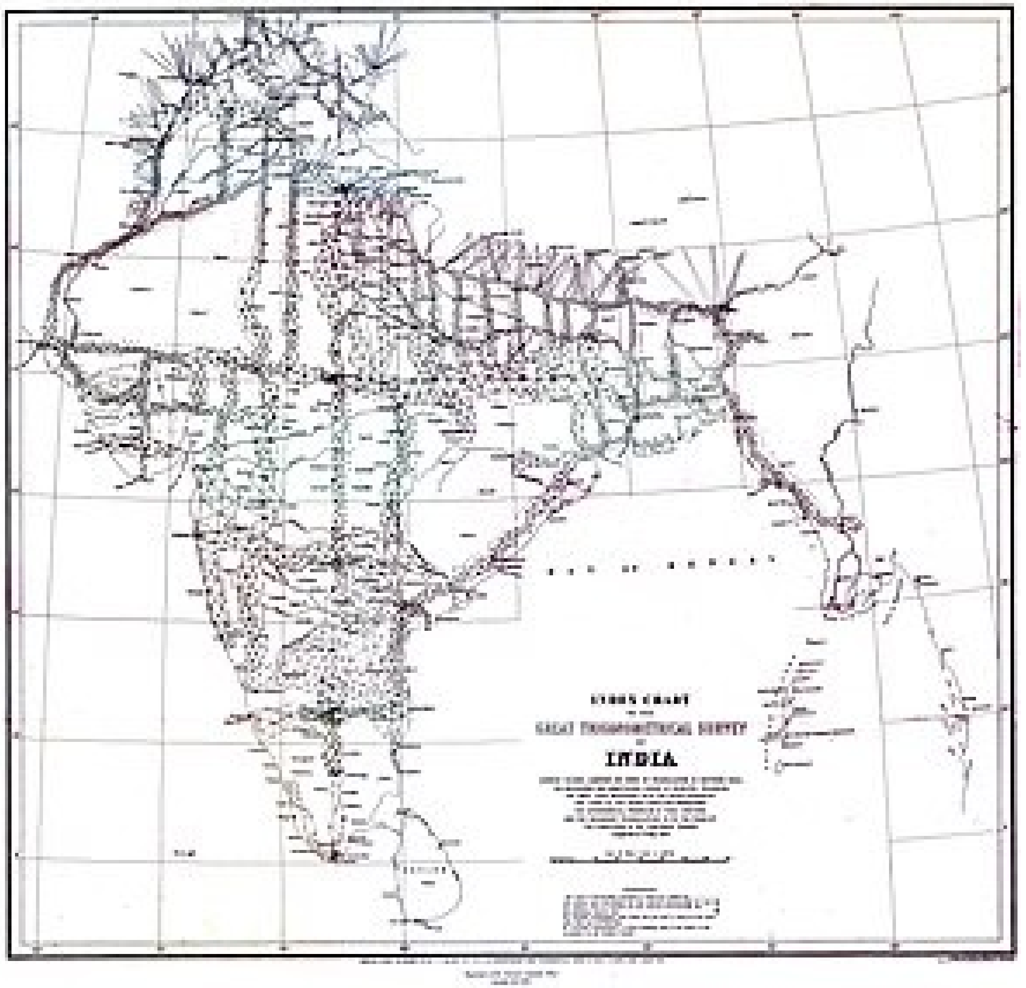
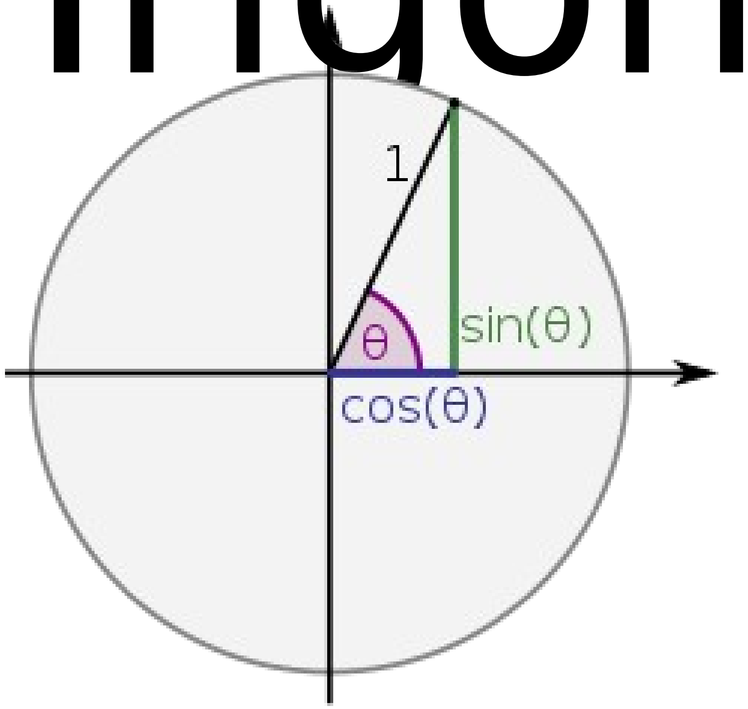
The Great Trigonometrical Survey of India



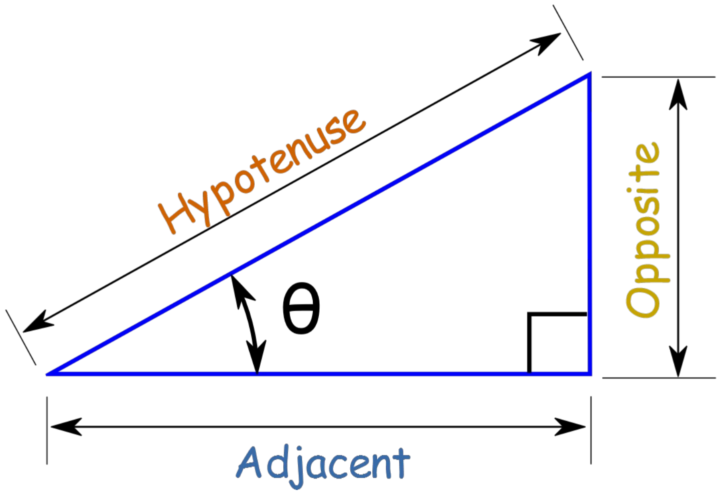
Trigonometry



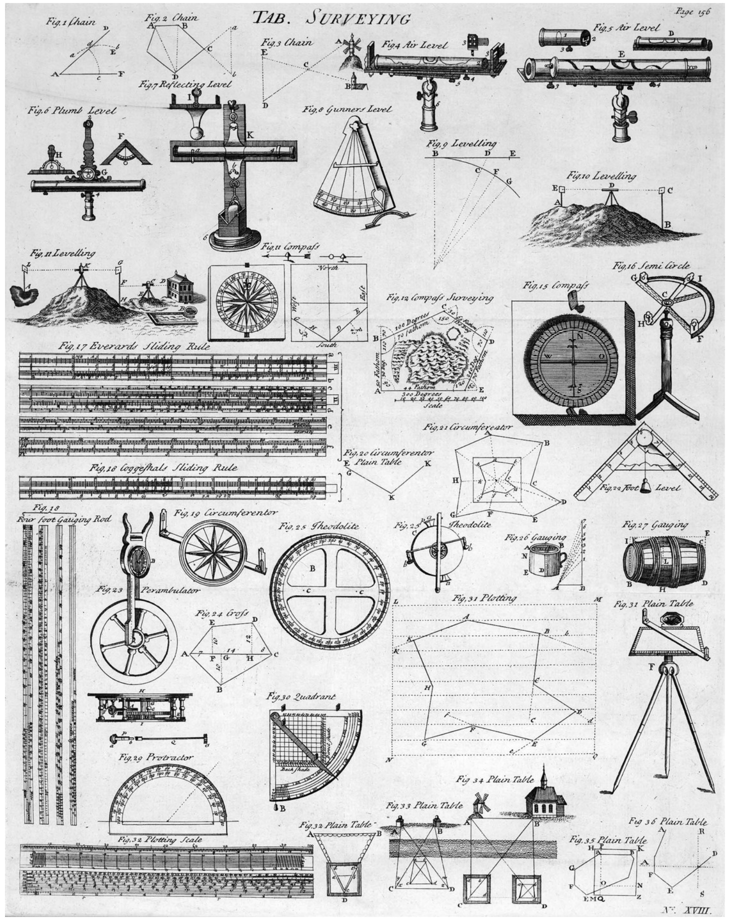
$$\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

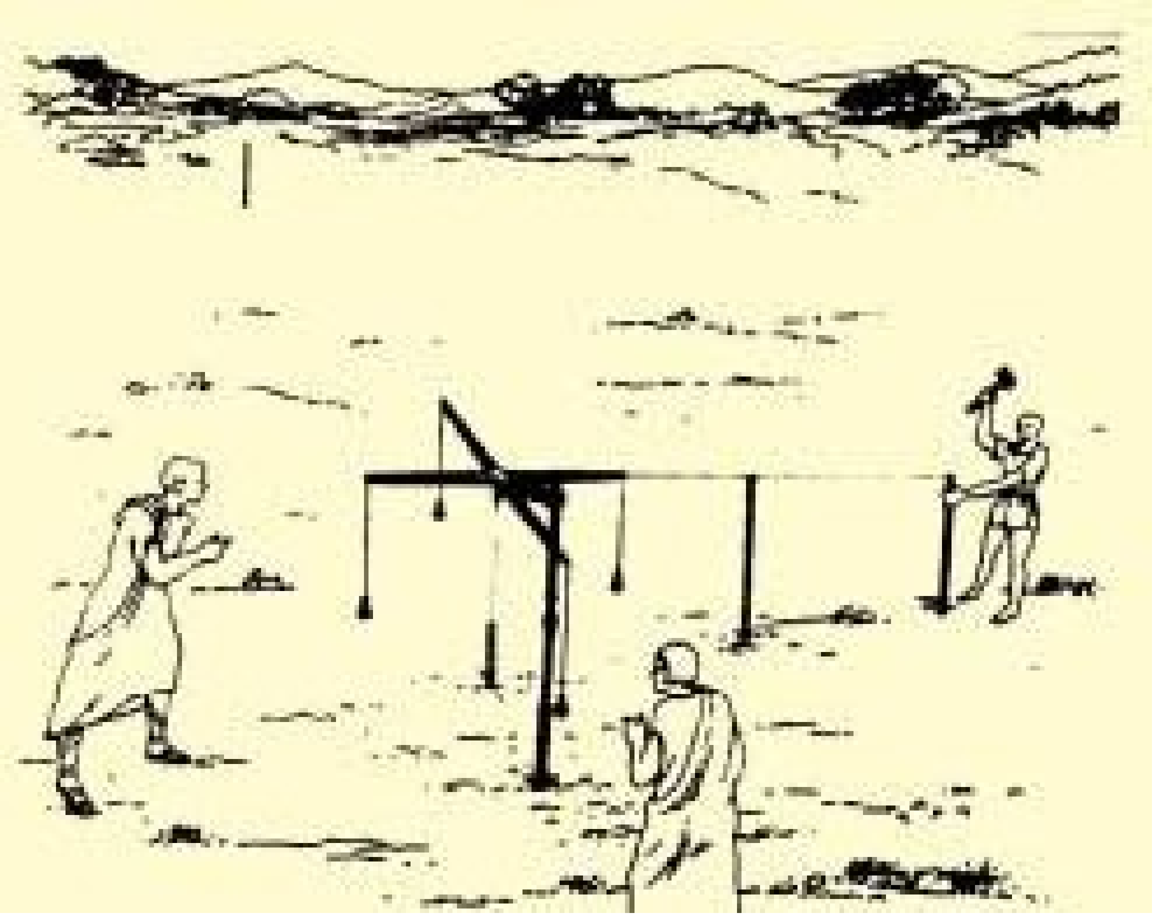
$$\cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$$

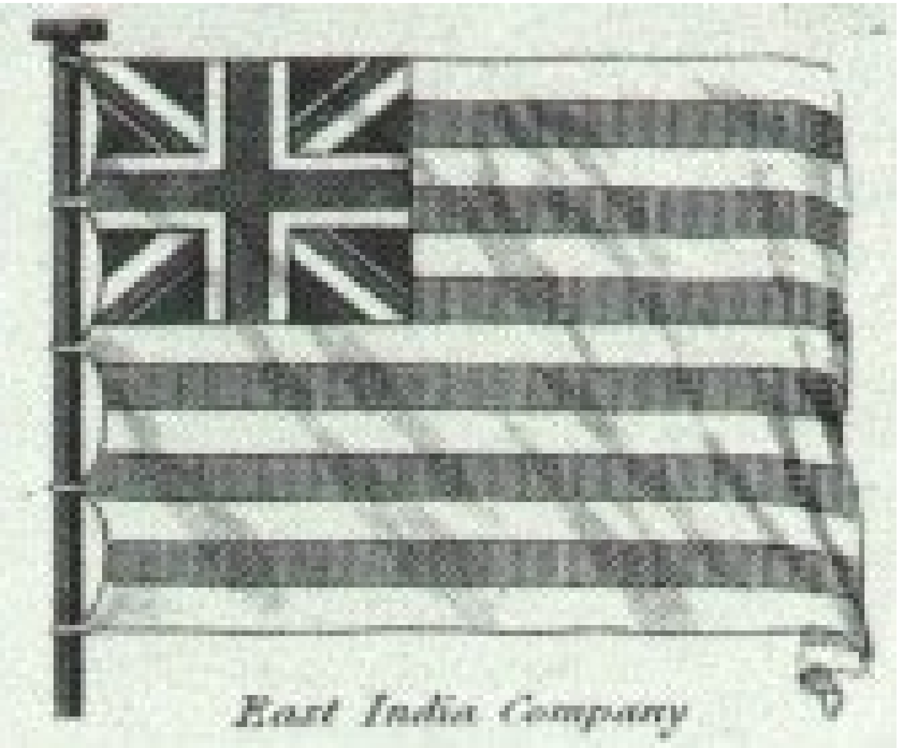


Surveying and its history



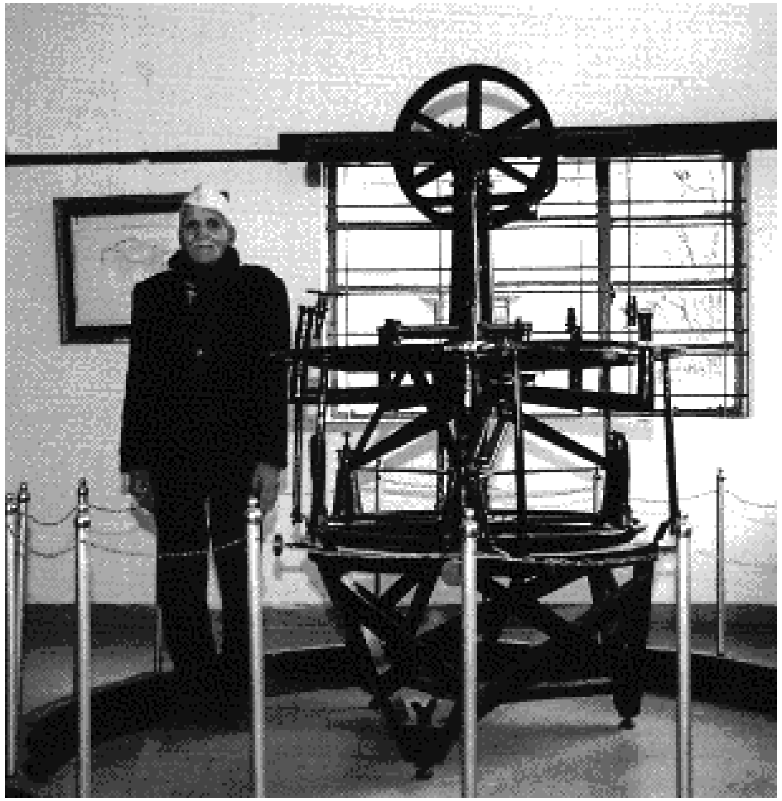


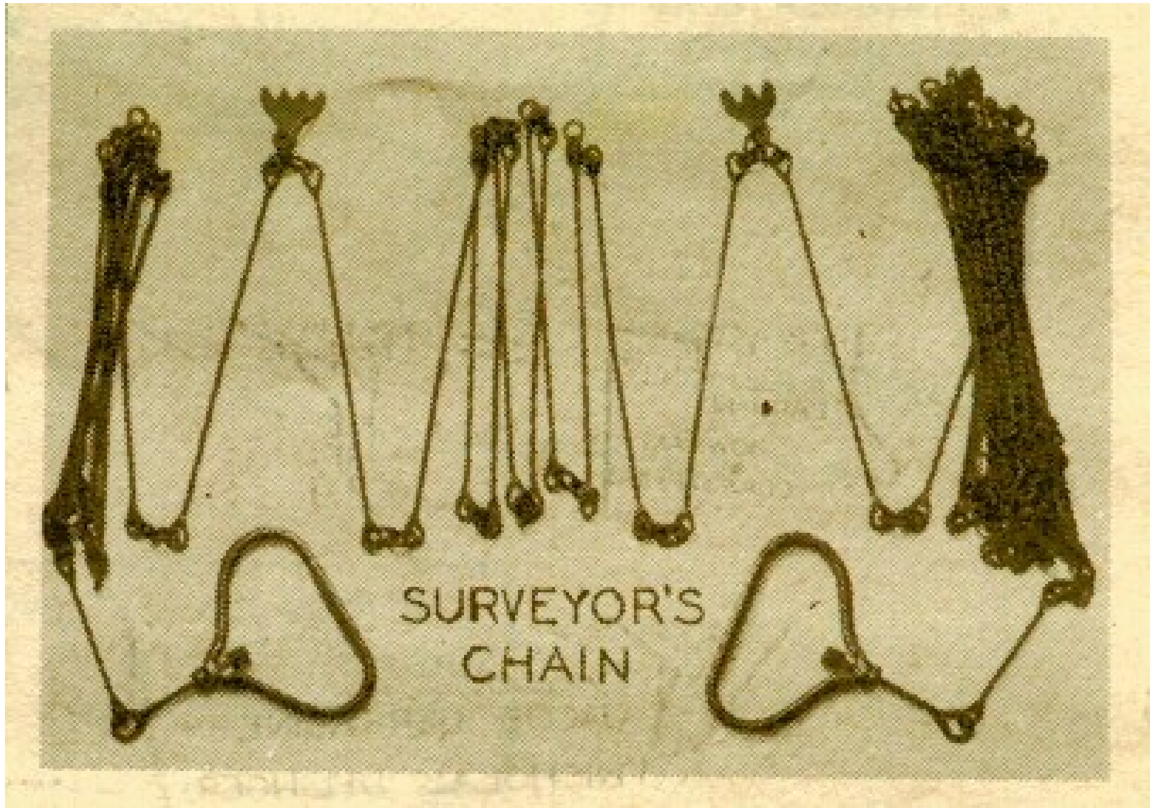
The English East India Company



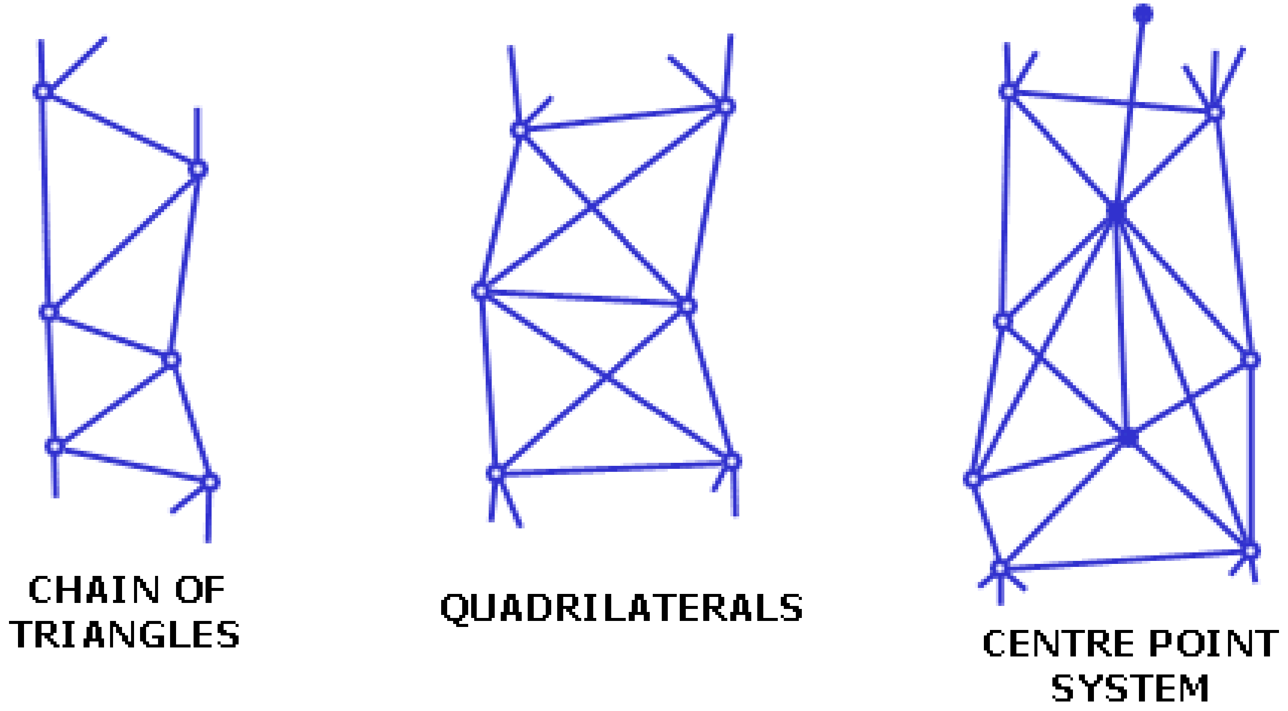
The William Lambton period

Instruments and tools of the trade





Methods and accuracy



Correcting deviations

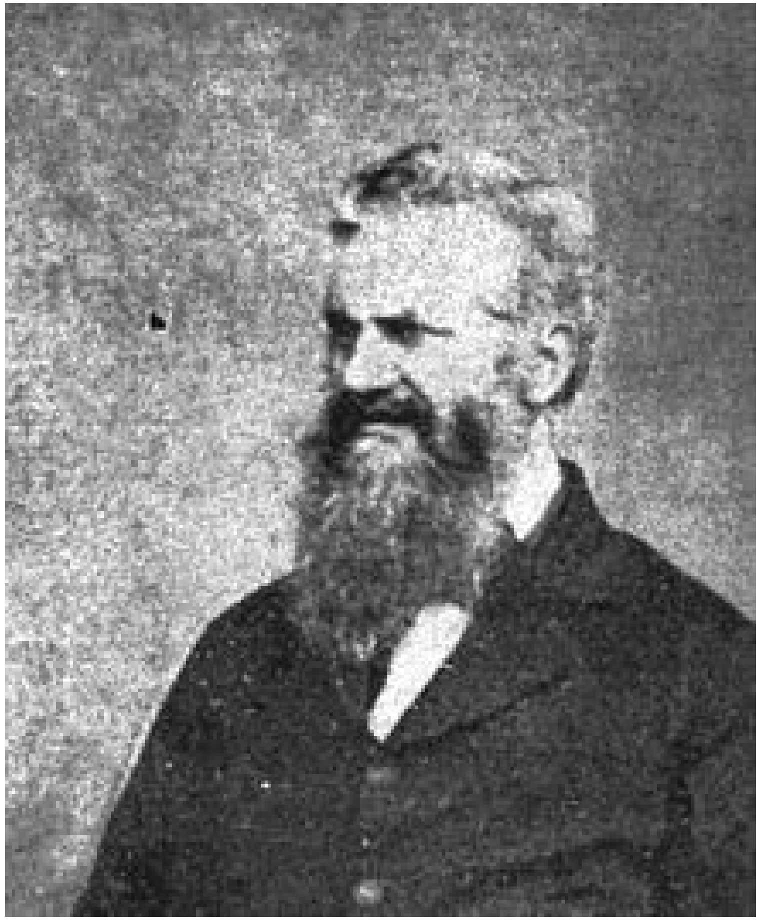
To achieve the highest degree of accuracy, a number of corrections were applied to all distances calculated from simple trigonometry.

- Temperature.
- Curvature of the Earth.
- Non-spherical nature of the curvature of the Earth.
- Gravitational influence of mountains on pendulums and plumblines.
- Refraction (bending of light rays).
- Height above sea level.

The George Everest Period

- Joined survey : 1818.
- Assumed command : 1823.
- A disciplinarian.
- Sick, returned to England: 1825.
- Returned to India: 1830.
- Introduced gridiron system.
- Introduced night surveying.
- Extended survey to Himalayas
- Great arc enthusiast.

The Sir Andrew Scott Waugh period



- Became head of survey 1843.
- Completed Great Arch series.
- Completed Calcutta series.
- Completed north-eastern Himalaya series.
- Determined heights of 79 Himalayan peaks, and named the tallest one after George Everest

The James walker period.

- Became head of the survey upon retirement of Waugh in 1861
- Largely completed the Great trigonometrical Survey.

Specially made instruments and contributions of Indians

Crafting of precision instruments

- When precision instruments could not be purchased, they were specially made by:
- Henry Bower.
- Syed Mohsin (The best craftsman they had, an Indian)
- Cooke.

Indian Mathematician

- The Indian mathematician Radhanath Sikdar performed important calculations for the project.

Conclusion

- At the time, this was the greatest and most accurate survey ever undertaken.
- When the survey was completed, India was arguably the most accurately surveyed place in the world.
- The survey determined the heights of many of the great Himalayan peaks, including the tallest one, Mount Everest.
- The Survey helped to determine the actual shape of the Earth.